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$$\int_0^y \frac{dt}{\sqrt{\alpha - 2d \log t}} + x + \beta = 0.$$

6. When  $c = d = 0$ ,  $a \neq 0$ ,  $b \neq 0$ . The general solution is given by the equation

$$\int_0^y \frac{at^a dt}{bt^a - \alpha} + x + \beta = 0.$$

7. When  $a = b = 0$ ,  $c \neq 0$ ,  $d \neq 0$ . The general solution is given by the equation

$$\int_0^y \frac{dt}{\sqrt{\alpha - 2ct - 2d \log t}} + x + \beta = 0.$$

Returning now to the general equation (1), put

$$t = \alpha x + \beta,$$

where  $\alpha$  and  $\beta$  are any constants except that  $\alpha$  is to be different from zero. Then the differential equation becomes

$$(2) \quad y \frac{d^2 y}{dt^2} + a \left( \frac{dy}{dt} \right)^2 + \frac{b}{\alpha} \frac{dy}{dt} + \frac{c}{\alpha^2} y + \frac{d}{\alpha^2} = 0.$$

If the original equation (1) has the solution

$$(3) \quad y = f(x, a, b, c, d),$$

then equation (2) has the solution

$$y = f\left(t, a, \frac{b}{\alpha}, \frac{c}{\alpha^2}, \frac{d}{\alpha^2}\right),$$

and hence the original equation (1) has the solution

$$(4) \quad y = f\left(\alpha x + \beta, a, \frac{b}{\alpha}, \frac{c}{\alpha^2}, \frac{d}{\alpha^2}\right).$$

Therefore, if any solution (3) of (1) is known, actually involving  $x$ , a solution exists in the form (4) involving two arbitrary constants. This fact may be of use in obtaining the general solution of (1).

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## NOTES AND NEWS.

UNDER THE DIRECTION OF FLORIAN CAJORI.

Professor M. Fréchet, of Poitiers, France, is expected to lecture at the University of Illinois during the next academic year.

The Royal Society has awarded the Sylvester medal to J. W. L. Glaisher, F.R.S., for his mathematical researches.

Dr. Karl Boehm, of Heidelberg, succeeds Professor G. Faber as professor of mathematics in the University of Königsberg.

A portrait of Professor Horace Lamb, well known for his researches in mathematical physics, was presented by subscribers to the University of Manchester, where he has filled the chair of mathematics since 1885. The portrait was painted by his son, Henry Lamb, a rising young artist.

The German Mathematical Society recently subscribed 500 francs per year, for five years, in addition to its earlier subscription of 5,000 francs, toward the cost of the publication of Euler's Complete Works. This cost is now estimated at one million francs, which is twice the original estimate.

The Irish Journal of Education for December, 1913, contains the second installment of the Report of the National Committee of Fifteen on Geometry Syllabus (U. S. A.), which it is reprinting in full. Five hundred copies of this report have recently been purchased by the State Department of New Jersey and placed in the hands of all teachers of geometry in the state.

Dr. Edward L. Dodd, of the University of Texas, contributes to the *Giornale di Matematiche di Battaglini* (Vol. 51, 1913) an interesting article on "A justification of empirical probability based upon an undetermined *a priori* probability." The topic is particularly important in life insurance.

A biography and popular account of the discoveries of T. J. J. See has been written by W. L. Webb. The book includes a statement in non-technical language of See's theories on the creation of the earth and the heavens.

Cosmological speculations receive attention in the January number of *Scientia*, an international review of scientific synthesis, edited by Italian scholars. Professor T. C. Chamberlin, of the University of Chicago, has an article on Planetesimal Hypotheses; the astronomer A. C. D. Crommelin, of Greenwich, writes on the Capture Theory of Satellites; Dr. T. J. J. See discusses the law of nature in celestial evolution.

Sir Robert S. Ball, Lowndean professor of astronomy and geometry in the University of Cambridge, died November 25, 1913, at the age of 73. Along the lines of applied mathematics he contributed a work on *Experimental Mechanics* in 1871, and one on the *Theory of Screws* in 1900, which embodies important researches begun by him in 1870 and published in a series of memoirs. After 1884 he did very little observing, probably on account of trouble with one of his eyes, accidentally injured in his youth and finally removed in 1897.

Dr. Artemas Martin, of Washington, D. C., has recently published in the *Mathematical Magazine* a paper on "The algebraic solution of the famous three point problem." The problem is to determine a point in the plane of a given triangle at which the sides subtend given angles. The two papers read by Dr. Martin at the International Congress of Mathematicians at Cambridge, England,

in 1912 have been published in the proceedings of the congress. The titles of these papers are "On rational right-angled triangles" and "On powers of numbers whose sum is the same power of some number."

Yoshio Mikami read before the Tôkyô Mathematico-Physical Society, and brought out in the *Tôkyô Sûgaku-Buturigakkwai Kizi* (2 S., Vol. VII, No. 9, p. 157), an article on the formula for an arc of a circle, found in the "Kwatsuyô Sampô," a treatise printed in 1712 as a posthumous work of Seki Kôwa and probably composed as early as 1683. Mikami gives a fuller historical and analytical discussion than previously given, of Seki Kôwa's formula,

$$1276900(d-s)^5a^2 = 5107600d^6s - 23835415d^5s^2 + 43470240d^4s^3 - 37997429d^3s^4 \\ + 15047062d^2s^5 - 1501025ds^6 - 281290s^7 \dots,$$

which may be used for the numerical calculation of an arc  $a$  of a circle of diameter  $d$ , whose altitude is  $s$ .

Dr. A. Mitzscherling has produced an interesting book, *Das Problem der Kreisteilung* (Teubner, 1913), which treats the subject historically. It considers the construction of regular polygons, the trisection and multisection of angles, the mechanisms by which these sections can be effected, and also the methods of approximation. Eight different elementary methods of inscribing a regular polygon of 17 sides are given in detail. For multisection 27 different curves are used. Among American writers reviewed in the book are Dexter, J. B. Miller, T. W. Nicholson and E. W. Hyde.

C. F. B. Funk has an article in Schotten's *Zeitschrift* (November, 1913, p. 463), in which he offers a detailed exposition of logarithmic theory along the lines suggested by Felix Klein in his *Elementarmathematik vom höheren Standpunkt*. It is well known that Klein exposes the defects of the current definition of logarithms and suggests that, for school purposes, logarithms be defined geometrically by means of the equilateral hyperbola. He leaves the elaboration of details of his program to the experienced teacher of elementary mathematics. A detailed exposition was given by C. Frenzel in Schotten's *Zeitschrift*, Vol. 44, p. 1, and is now attempted for a second time by Funk.

The question of the adoption of the metric system in the United States and Great Britain will soon become a matter not merely of educational and scientific concern, but also of economic and trade importance. As pointed out in *Nature* (Nov. 27, 1913, p. 384) the adoption of the metric system promises to become, in the near future, a necessity in our trade dealings with China, Japan and Siam. These countries have taken steps to establish that system. In Japan the system is now obligatory for the services of the customs, excepting a few articles, also for the army, for medicine and for electrical work. Russia is taking steps pointing toward the general introduction of the metric system. The rest of Continental Europe has already adopted the metric reform.

The definitive program for the meeting of the International Commission on

the Teaching of Mathematics to be held at Paris in April, 1914, will consist of three sessions daily from April 1 to 4 inclusive:

*First day:* Session of the Central Committee. Business Session of the Commission. Session of the Mathematical Society of France.

*Second day:* General opening session. President, L. Poincaré, Director of Secondary Instruction, representing the Minister of Public Instruction. Address of welcome by P. Appell, Dean of the Faculty of Science, member of the Institute. Response by the President of the commission, F. Klein, of Göttingen. Address by the representative of the Minister of Public Instruction. Lecture by E. Borel on "The adaptation of instruction to the progress of science." Lecture by M. D'Ocagne on "The role of mathematics in the engineering sciences." Working session, taking up question A:—"The introduction of the elementary notions of the differential and integral calculus into secondary instruction." General reporter, E. Beke of Budapest.

*Third day:* Working session, taking up question B:—"The mathematical instruction of engineering students." General Reporter, P. Staedel, of Heidelberg. Working session. Discussion on the teaching of mathematics in engineering schools. Meeting of the Society of Civil Engineers.

*Fourth day:* Working session. Conclusion of the discussion of questions A and B. Summaries by the general reporters. Business session. Consideration of the future work of the commission, in particular of the program for the meeting of the commission to be held at Munich in 1915, whose principal topic has already been fixed as "The theoretic and practical preparation of instructors of mathematics for the various stages of work." Reception by Prince Bonaparte.

Mr. C. Bourlet, who died last August, has been succeeded in the Commission by C. Bloche, and Messrs. A. de Saint Germain; and C. A. Laisant, who have resigned from the Commission for reasons of health and age, have been replaced by J. Hadamard and M. d'Ocagne.

The sessions will be held at the Sorbonne except as otherwise specified. The general opening session will be public. Admission to the working sessions will be limited to members of the Commission and of the various National Subcommissions and Committees, and to such other persons as shall have been furnished with tickets of admission by the General Secretary.

The Philosophical Society of France, in conjunction with the publishers of the Encyclopedia of the Mathematical Sciences, invites the mathematicians present in Paris on the occasion of this Congress to a series of sessions to be held April 6-8, at which various questions on the philosophy of mathematics will be considered. The Physical Society of France will hold its annual session and exposition of recent apparatus at Paris, April 15-17.